

Effects of dry and wet N deposition on vegetation and biogeochemistry of an ombrotrophic bog

Elleke van Zetten¹, Irene de Lange¹, Lucy J Sheppard², Ian D Leith², Alan Crossley², Leon van den Berg^{1,3}, Jan Roelofs¹

.....
¹*Radboud University Nijmegen (Netherlands)*

²*Centre for Ecology and Hydrology (Edinburgh), Bush Estate, Penicuik EH26 0QB*

³*Environment Department University of York, Heslington York*
.....

It has repeatedly been shown that increased nitrogen (N) deposition results in dramatic shifts in vegetation composition. The sources of N-deposition vary from agriculture (mainly NH₃ and NH₄) to industry and traffic (mainly NO_x).

Effects of these different N forms on the vegetation and biogeochemistry of an ombrotrophic peat bog, Whim Moss (~15km southwest of Edinburgh), have been investigated since April 2002, by employing an automate N manipulation system. This field experiment, uniquely, offers the possibility to investigate the effects of the different N forms at the same site and at application rates and deposition scenarios simulating natural variation in rainfall. Within the manipulation system there are two N manipulations: **Dry**, where gaseous NH₃ is released over a 60 m transect at concentrations that simulate a 100,000 bird poultry unit (0.4-200 µg m⁻³), and **Wet**, as soluble nitrate or ammonium, covering the full range of UK wet N-deposition (8 – 64 kg N ha⁻¹yr⁻¹).

The effects of dry N deposition on the vegetation and biogeochemistry at different distances from the NH₃ source have been analysed. In the wet N deposition experiment, 5 treatments were followed, ranging from 8-64 kg N ha⁻¹yr⁻¹ and differing in N form as either oxidised or reduced N.

Samples of soil water were obtained using mini-rhizon samplers and were tested for pH, NH₄, NO₃, P and base cations. Young (1 year old) shoots of *Calluna vulgaris* L. (Hull), *Erica tetralix* L. and *Sphagnum capillifolium* Ehrh. (Hedw.) were harvested and tested for chlorophyll concentrations, aminoacids and P and base cation concentrations in acid digests.

The preliminary results show differences between treatment N forms and N doses and along the NH₃ gradient. In this presentation we will focus on the plant responses to the changes in the biochemistry.